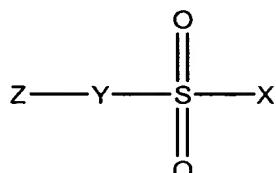


CLAIMS

1. A plant cell surface comprising an effective amount of bioavailable anti-fouling compound represented by general structure 1:



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wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m-\text{R}_{80}$;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m-\text{R}_{80}$;

R_{80} represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

15 m is an integer in the range 0 to 8 inclusive, or a salt thereof,

wherein the compound or a biologically active fragment thereof can be released from the surface in the presence of a liquid or vapor.

2. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br.

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3. A plant cell surface of claim 1, wherein Y represents O.

4. A plant cell surface of claim 1, wherein Z represents optionally substituted alkyl, aryl, or $-(\text{CH}_2)_m-\text{R}_{80}$.

5. A plant cell surface of claim 1, wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

5 6. A plant cell surface of claim 1, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

10 7. A plant cell surface of claim 1, wherein R represents H or alkyl.

8. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Y represents O.

15 9. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Y represents O.

10. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

20 11. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

12. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

25 13. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

14. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

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15. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

10 16. A plant cell surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

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17. A plant cell surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

18. A plant cell surface of claim 1, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

20 19. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

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20. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

21. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

22. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

5 23. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

10 24. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15 25. A plant cell surface of claim 1, wherein the surface is a coating.

26. A plant cell surface of claim 25, wherein the coating is temporary

27. A plant cell surface of claim 25, wherein the coating is semi-permanent.

20 28. A plant cell surface of claim 25, wherein the coating is permanent.

25 29. A plant cell surface of claim 1, wherein the effective amount reduces the number of plant pathogens on a plant cell surface over a defined period of time by a factor of 4 relative to a control plant cell, which does not comprise the compound.

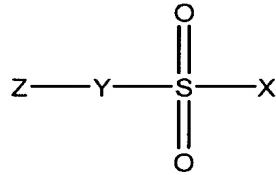
30. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 8 relative to a control plant cell, which does not comprise the compound.

5 31. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 10.

32. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 15.

10 33. A plant cell surface of claim 1, wherein the release of the compound is at a constant rate. *PAB*

34. A coating for contacting a plant cell surface comprising an effective amount of an anti-fouling compound represented by general structure 1:



15 wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

20 Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m-\text{R}_{80}$;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m-\text{R}_{80}$;

R_{80} represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive or a salt thereof,
wherein the coating releases the compound or a biologically active fragment thereof when in
contact with a liquid or vapor.

5 35. A coating of claim 34, wherein X represents -OH, F, Cl, or Br.

36. A coating of claim 34, wherein Y represents O.

10 37. A coating of claim 34, wherein Z represents optionally substituted alkyl, aryl, or -
 $(CH_2)_m-R_{80}$.

38. A coating of claim 34, wherein Z represents optionally substituted alkylphenyl,
heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

15 39. A coating of claim 34, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-
(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-
phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

40. A coating of claim 34, wherein R represents H or alkyl.

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41. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Y represents O.

42. A coating of claim 34, wherein X represents -OH or Cl; and Y represents O.

25 43. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents
optionally substituted alkyl, aryl, or $(CH_2)_m-R_{80}$.

44. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

5 45. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

46. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

10 47. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15 48. A coating of claim 34, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

20 49. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

50. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

25 51. A coating of claim 34, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

52. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or -(CH₂)_m-R₈₀.

5 53. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents
optionally substituted alkyl, aryl, or -(CH₂)_m-R₈₀.

10 54. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

55. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents
optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

15 56. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

20 57. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents
methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

25 58. A coating of claim 57, wherein the coating is temporary.

59. A coating of claim 57, wherein the coating is semi-permanent.

60. A coating of claim 57, wherein the coating is permanent.

61. A coating of claim 34, wherein the effective amount reduces the number of plant pathogens on a plant cell surface over a defined period of time by a factor of 4 relative to a control plant cell, which does not comprise the compound.

5 62. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 8 relative to a control plant cell, which does not comprise the compound.

10 63. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 10.

15 64. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 15.

65. A coating of claim 34, wherein the release of the compound is at a constant rate

66. A coating of claim 34, which is a liquid.

67. A coating of claim 34, which is a gas or vapor.

68. A coating of claim 34, which is a paste or other semi-solid state.

69. A coating of claim 34, which is a solid.

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70. A coating of claim 34, which is a liquid and solidifies into a hard coating on a surface.